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**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

*In the Matter of Wireless Telecommunications Bureau and Office of Engineering and Technology Seek
Comment on NextNav Inc. Petition for Rulemaking*

WT Docket No. 24-240 RM-11989

COMMENTS OF ECOBEE AND GENERAC POWER SYSTEMS INC.

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TABLE OF CONTENTS

I.	INTRODUCTION AND SUMMARY	3
II.	ECOBEE'S TECHNOLOGY OPTIMIZES THE 915 MHz FREQUENCY BAND	3
III.	TECHNICAL IMPLICATIONS FOR EXISTING DEVICES	4
A.	Frequency Agility is Not Universal.....	5
B.	Safeguarding Interference Protections for Part 15 Unlicensed Devices.....	5
IV.	ESTIMATED MARKET IMPACT FOR ECOBEE'S PORTFOLIO	6
A.	Estimated Costs to Recall and Replace Existing Devices	7
B.	Associated Non-hardware Costs to Recall and Replace Existing Devices.....	7
V.	ECOBEE'S FOOTPRINT AND BROADER CUSTOMER IMPACTS	8
A.	Participation in Electric Utility Programs	8
B.	Contributions of Smart Thermostats to Electric Grid Resiliency.....	9
VI.	CONCLUSION	10

COMMENTS of ECOBEE and GENERAC POWER SYSTEMS INC.

I. INTRODUCTION AND SUMMARY

ecobee ("ecobee") and Generac Power Systems Inc. ("Generac") respectfully submit these comments to the Federal Communications Commission (FCC) in strong opposition to NextNav's petition to modify the 902-928 MHz band for its positioning, navigation, and timing (PNT) services. ecobee is an industry leading smart thermostat company with over 4.6 million Part 15 sensors and over 12 million smart thermostats in-market today. ecobee is also a subsidiary of Generac Power Systems (NYSE: GNRC), a principal energy technology company that provides backup power products and energy storage systems for home and business applications, as well as energy monitoring and management devices and services.

ecobee appreciates the rigor and appropriate scrutiny with which the Commission is exploring NextNav's petition and the potential implications for stakeholders. NextNav's proposal would cause irreparable harm to the numerous users that operate in the 915 MHz band that cannot simply be reconfigured to NextNav's request to dominate and limit use of this spectrum by others. ecobee's smart thermostat solutions serve as a hub for energy controls across users' homes, working with various remote occupancy sensors that utilize the 915 MHz band. ecobee's entire battery sensor portfolio operates within this frequency band for long-range proprietary networking communications. If NextNav's proposed changes to the 915 MHz band were to be authorized, this would significantly undermine ecobee's ability to operate its connected devices. ecobee submits the following comments in response to NextNav's unsubstantiated proposal to capture the majority of the 902-928 MHz band and limit access for millions of incumbent users

II. ECOBEE'S TECHNOLOGY OPTIMIZES THE 915 MHZ FREQUENCY BAND

NextNav presumes that shifting non-M-LMS licensees to the 907-918 MHz portion of the band is a sufficient response to its unsupported petition. They strongly discount that myriad technologies cannot simply 'swap' to the middle portion of the band and deliver quality products. For ecobee, our proprietary wireless sensors use this frequency band to communicate across devices and have been designed to use a custom

protocol that operates between 920 MHz and 927.35 MHz and that has minimal, but essential, packet exchange that improves electrical grid resiliency and energy savings in the United States. These sensors dictate various controls that are intrinsic to the device, such as providing temperature and occupancy data to reduce domestic power consumption in real-time to increase resiliency of critical electrical infrastructure in the United States. ecobee's devices also deliver long-lasting battery life, longer range communications across devices, and remain unaffected by extraneous congestion as compared to devices solely using Wi-Fi or other off-the-shelf protocols. These features are integral to ecobee's success as a leading smart thermostat solution and are not replicable with another communication protocol, nor can they operate on a different frequency band. Moreover, the frequencies that ecobee's technology uses are permanently configured in our devices' remote sensors and cannot be modified remotely.

A wireless signal at 920 MHz, as compared to 2.4GHz, is a materially more efficient way to enable inter-device communication for sensors without the need for hubs or repeaters; lower frequencies have better penetration and reduced path loss. If ecobee's sensors cannot communicate across obstacles like walls and floors, they cannot orchestrate their various controls within a home. Diminishing the efficacy of ecobee's sensors will hinder the energy efficiency these devices deliver to customers' homes.

Lastly, ecobee is concerned that requiring provisions such as Listen Before Talk (LBT) to prioritize M-LMS communications will significantly deteriorate the battery life of wireless devices. ecobee's sensors have been optimized to avoid communication overhead associated with LBT. If LBT were to become standard protocol for Part 15 devices, this would markedly reduce the smart sensors' battery lives, rendering them unreliable and cost ineffective for homeowners.

III. TECHNICAL IMPLICATIONS FOR EXISTING DEVICES

Notwithstanding ecobee's strong opposition to modifying use of 902-928MHz band, NextNav has not adequately demonstrated how this proposal would effectively function. NextNav's petition asserts that coexistence between its proposed system and existing unlicensed Part 15 operations should be achievable but

fails to explain how. They claim they would minimize interference and work with unlicensed incumbents but have not provided sufficient technical details for the affected industries to thoroughly understand and potentially plan for any impact.

A. Frequency Agility is Not Universal

ecobee challenges NextNav's assumption that most systems will not suffer degradation because of their "understanding that most non-M-LMS equipment is frequency agile".¹ NextNav's proposal would severely diminish the performance of all devices operating within the current band by compressing all non-M-LMS devices into a narrow spectrum. Whether a system employs direct sequence spread spectrum (DSSS) or frequency hopping spread spectrum (FHSS) to achieve frequency agility, most existing channels will be susceptible to interference or will not be able to operate on the channel per NextNav's request. These systems will be required to retransmit their message to conform to fall within the narrow middle band NextNav proposes these users to operate under. Additionally, frequency agility provisions in Part 15.247 do not require that devices operate across the entire 902MHz to 928MHz. In the case of ecobee products, many devices will be completely unusable should their current wireless protocols exist within frequencies that NextNav seeks to dedicate for its N-MLS spectrum. With respect to ecobee's products, ecobee's protocol works solely within the 920 MHz and 927.35 MHz band. This means that ecobee's protocol never communicates within the middle band and only communicates on the downlink band. By granting NextNav's proposal, 100% of ecobee's battery sensor portfolio in the field would be severely impaired or rendered inoperable.

B. Safeguarding Interference Protections for Part 15 Unlicensed Devices

ecobee also scrutinizes NextNav's request to eliminate the rules governing coexistence and unreasonable interference between licensed LMS users and Part 15 unlicensed devices utilizing the 915 MHz band. NextNav's assertion that modifying the base stations would not cause unreasonable interference with other Part 15 devices within the band is baseless. NextNav's petition would exacerbate interference for current

¹ NextNav Petition at 31.

users because of their request to expand the power output of the base stations. With stronger power output from base stations transmitting between 1000W and 2000W, devices like ecobee's cannot be guaranteed to operate without interference if current Commission rules are suspended. ecobee refutes NextNav's claim² unlicensed devices may not cause harmful interference to LMS licensees, amateur operations, or other licensed systems in the 915 MHz band. M-LMS licensees must also demonstrate that their systems do not cause *unacceptable levels of interference* to Part 15 devices.³ If NextNav's proposal is adopted, ecobee battery sensor devices may, in many cases, become inoperable within the band, which would be an unacceptable level of disruption for the company's operations.

The petition does not explain how NextNav would practically coexist with Part 15 devices operating within the new proposed uplink and downlink bands. ecobee's devices cannot receive over-the-air upgrades to modify wireless operations, which means that they cannot respond to or modify which wireless frequency they are operating on to communicate. ecobee's only compliance option would be to entirely redesign and replace its over 4.6 million Part 15 wireless sensors in circulation. Not only is this solution impractical for ecobee's business, but it is also impossible to enforce at the customer level where devices operate in individual homes.

IV. ESTIMATED MARKET IMPACT FOR ECOBEE'S PORTFOLIO

ecobee estimates that nearly all of its existing sensors would be unable to comply with NextNav's proposal. There is no mechanism to force existing devices to stop operating on the 915 MHz band. ecobee believes that the only feasible resolution would include redesigning its radio frequency protocol to comply with new rules, producing sensors under this protocol and then phasing in a replacement period for all existing devices in the field. This is both an unreasonable and unrealistic expectation for any business to implement.

³ [Economic Areas] EA multilateral LMS licenses will be conditioned upon the licensee's ability to demonstrate through actual field tests that their systems do not cause unacceptable levels of interference to [47 CFR part 15](#) devices. 47 C.F.R. § 90.353(d).

Nonetheless, in response to the Commission's request to understand the potential impact incumbent relocation would have on ecobee, we offer the following data.

A. Estimated Costs to Recall and Replace Existing Devices

In addition to the major disruption to ecobee's business and customers, ecobee estimates that relinquishing its use of the 915MHz band would result in a significant financial impact. To implement a recall and replace for all devices in the field, ecobee has identified the following cost categories for its 4.6 million Part 15 wireless sensors. In tandem with product replacement, ecobee would also need to engage across the business in a holistic redesign of its sensors. This would require the core redesign, the development of tools and prototypes, broad marketing to product and customer channels, and robust management of the rebranding and required communications. Each of these has an associated cost to implement a mass recall and replacement of existing devices.

PRODUCT COST CATEGORIES
Pack of sensors
Room sensors
D&W contact
Shipping and warehouse processing for room sensors and D&W contact
Associated customer service costs to issue sensor RMA
Ancillary customer costs for sales and market
Ancillary customer costs for customer service
Redesign costs
Costs to develop tools and prototypes
Marketing
Brand/communications

B. Associated Non-hardware Costs to Recall and Replace Existing Devices

ecobee has also analyzed the various personnel costs to address these changes across the business.

These include personnel to adequately respond to the changes for product management, customer service, logistics, marketing, communications, and brand impact. The projected headcount would require a minimum of 29 ecobee personnel including but not limited to: 8 firmware engineers, 8 hardware engineers, 1 product manager, 3 manufacturing roles, 4 customer service employees, 4 logistics managers, and 1 finance officer. In

terms of total full-time equivalent (FTE) effort, we expect at least two years for a dedicated team to implement these changes.

V. ECOBEE'S FOOTPRINT AND BROADER CUSTOMER IMPACTS

ecobee's 5 million+ footprint of smart thermostats has a deep impact on the development of the market for smart energy home solutions and customer access to this technology. ecobee's mission to improve home energy efficiency has earned its recognition with the Environmental Protection Agency (EPA), becoming one of the first companies to receive ENERGY STAR certification. As an ENERGY STAR device, ecobee reinforces energy management that generates critical savings for customers and for the electrical grid. ecobee also currently participates in over 95 electric utility programs that offer customers incentives to make smart thermostat technologies accessible. Within these programs, ecobee's largest income qualified program provides 15,000 smart thermostats *annually*. NextNav's proposal would put these programs at risk by undermining ecobee's ability to provide reliable technology.

A. Participation in Electric Utility Programs

ecobee is one of the largest providers of smart thermostats in North America and eliminating its ability to operationalize its core communication protocol will impact future engagement in utility demand response programs. There are over 893,696 ecobee thermostats currently enrolled in electric utility demand response programs. A smart thermostat demand response program is a utility company initiative during which a customer's device modifies their home's energy consumption during energy emergency events where there is an impending total grid outage. ecobee's Part 15 wireless sensors provide crucial human occupancy and room temperature data to the thermostats. This data allows the smart thermostat to only regulate to the necessary setpoint temperature in the target room and suspends regulation when a home is vacant, reducing unnecessary energy usage. In doing so, ecobee's devices moderate electricity demand during peak usage periods and can provide utilities with additional megawatts in an energy emergency across the entire ecobee fleet in their service territory, irrespective of individual enrollment in demand response. Utilities use these tools in long-term grid planning and smart thermostats play a pivotal role in driving customer participation. By 2027,

ecobee anticipates enrolling 1 million customers in demand response programs across the U.S. If the Commission ratifies NextNav's petition, ecobee's role in supporting electrical utilities' ability to achieve abatement targets will be diminished.

B. Contributions of Smart Thermostats to Electric Grid Resiliency

Across North America, there are more than 4.6 million ecobee wireless sensors that use the 915 MHz band. Smart thermostats use a combination of sensors, connectivity, and smart algorithms to manage climate control across a home. ecobee's fleet of smart thermostats' annual effect on American homes, vis-a-vis our sensors, leverages the 915 MHz ISM band to reduce the impact of the more than 170 billion kWh for cooling and more than 213 billion kWh in ventilation attributed to annual usage from heat, ventilation, and air conditioning (HVAC) systems in the U.S..⁴ In turn, this reduces electricity demand from an individual HVAC system where an ecobee thermostat is installed by up to 26%. For a typical residential home consuming 1441 kWh per month for air conditioning during June, July, August and September, a 26% savings in HVAC is analogous to lessening the energy demand equivalent of 7 dishwashers running throughout the year under typical conditions.⁵

Granting NextNav's proposal will hamper ecobee's ability to support grid resiliency as the degradation to the reliability of its Part 15 battery devices will reduce energy savings potential for homeowners and utility providers alike. Since 2007, through ecobee's grid resiliency technology, more than 31.9 terawatt hours of energy have been saved in large part, through the information leveraged through the Part 15 battery sensors. ⁶For context, this is the energy equivalent of aggregating all the homes in Chicago and Los Angeles off the grid for an entire year. These energy savings are vital to utilities' ability to prevent black-outs and excess grid strain. Moreover, these energy savings that are driven by the direct engagement with one's ecobee thermostat

⁴ [Frequently Asked Questions \(FAQs\) - U.S. Energy Information Administration \(EIA\)](#)

⁵ ENERGY STAR Certified Dishwashers and product details: <https://www.energystar.gov/productfinder/product/certified-residential-dishwashers/>

⁶ As of Q2 2024, ecobee's data reports a total of 31.9 TWh of energy savings from the grid.

also generate significant bill savings for our customers. Approval NextNav's proposal will create a pernicious vacuum in ecobee's ability to support grid resiliency and to undermine a critical strategy for reducing the frequency and duration of power grid disruptions. the frequency and duration of power grid disruptions.

VI. CONCLUSION

We thank the Commission for its consideration of these comments in this proceeding. ecobee respectfully urges that the Commission deny NextNav's petition and underscore current protections in place for Part 15 devices that provide significant contributions to consumers and critical infrastructure. The various technologies and industries dependent on the 915 MHz band play a vital role across our economy and should be protected accordingly. NextNav has not sufficiently justified its request to amend existing interference protocols, nor has it demonstrated how Part 15 unlicensed users will be able to operate if forcefully removed from the lower and higher sections of the 915 MHz band. For the reasons outlined in these comments, we urge the Commission to reject NexNav's petition for rulemaking. If you have any questions, please contact Jena Ginsburg, Senior Policy Manager at Generac Power Systems Inc., at jena.ginsburg@generac.com.

Respectfully submitted,

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